

Notice of Allowability

Application No.

10/805,499

Examiner

Brian Kunzer

Applicant(s)

AOYAGI, AKIYOSHI

Art Unit

2814

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address--

All claims being allowable, PROSECUTION ON THE MERITS IS (OR REMAINS) CLOSED in this application. If not included herewith (or previously mailed), a Notice of Allowance (PTOL-85) or other appropriate communication will be mailed in due course. **THIS NOTICE OF ALLOWABILITY IS NOT A GRANT OF PATENT RIGHTS.** This application is subject to withdrawal from issue at the initiative of the Office or upon petition by the applicant. See 37 CFR 1.313 and MPEP 1308.

1. ☒ This communication is responsive to 24 June 2004.
2. ☒ The allowed claim(s) is/are 1-13 and 16.
3. ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 - a) ☒ All b) ☐ Some* c) ☐ None of the:
 1. ☒ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this national stage application from the International Bureau (PCT Rule 17.2(a)).

* Certified copies not received: _____.

Applicant has THREE MONTHS FROM THE "MAILING DATE" of this communication to file a reply complying with the requirements noted below. Failure to timely comply will result in ABANDONMENT of this application.
THIS THREE-MONTH PERIOD IS NOT EXTENDABLE.

4. ☐ A SUBSTITUTE OATH OR DECLARATION must be submitted. Note the attached EXAMINER'S AMENDMENT or NOTICE OF INFORMAL PATENT APPLICATION (PTO-152) which gives reason(s) why the oath or declaration is deficient.
5. ☐ CORRECTED DRAWINGS (as "replacement sheets") must be submitted.
 - (a) ☐ including changes required by the Notice of Draftsperson's Patent Drawing Review (PTO-948) attached
 - 1) ☐ hereto or 2) ☐ to Paper No./Mail Date _____.
 - (b) ☐ including changes required by the attached Examiner's Amendment / Comment or in the Office action of Paper No./Mail Date _____.Identifying indicia such as the application number (see 37 CFR 1.84(c)) should be written on the drawings in the front (not the back) of each sheet. Replacement sheet(s) should be labeled as such in the header according to 37 CFR 1.121(d).
6. ☐ DEPOSIT OF and/or INFORMATION about the deposit of BIOLOGICAL MATERIAL must be submitted. Note the attached Examiner's comment regarding REQUIREMENT FOR THE DEPOSIT OF BIOLOGICAL MATERIAL.

Attachment(s)

1. ☒ Notice of References Cited (PTO-892)
2. ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3. ☒ Information Disclosure Statements (PTO-1449 or PTO/SB/08), Paper No./Mail Date 10/7/2005
4. ☐ Examiner's Comment Regarding Requirement for Deposit of Biological Material
5. ☐ Notice of Informal Patent Application (PTO-152)
6. ☐ Interview Summary (PTO-413), Paper No./Mail Date _____.
7. ☐ Examiner's Amendment/Comment
8. ☒ Examiner's Statement of Reasons for Allowance
9. ☐ Other _____.


ANH D. MAI
PRIMARY EXAMINER

DETAILED ACTION

Amendments

Applicant's amendment filed on December 29, 2005 has been received and entered. In summary, claims 14, 15, and 17-22 have been cancelled and claims 1, 6, 10-13 and 16 have been amended.

Allowable Subject Matter

1. Claims 1-13 and 16 are allowed.
2. The following is an examiner's statement of reasons for allowance:

Independent claims 1 and 12 are allowed because the prior art of record fails to disclose or suggest a semiconductor device comprising:

a first semiconductor package including a first curved substrate defining a first concave surface and a first convex surface and a plurality of first joining points, the first joining points are formed on the first convex surface and include different areas for protruding electrodes;

a second semiconductor package including a second curved substrate defining a second concave surface and a second convex surface and a plurality of second joining points, the second joining points are formed on the second convex surface and include different areas for the protruding electrodes and are arranged so as to be opposed to the respective first joining points.

Independent claim 6 is allowed because the prior art of record fails to disclose or suggest a semiconductor device comprising:

a first semiconductor package including a first curved substrate defining a first concave surface and a first convex surface;

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a second semiconductor package including a second curved substrate defining a second concave surface and a second convex surface, the second semiconductor package stacked on the first semiconductor package through a plurality of protruding electrodes including different volumes such that the first convex surface opposes the second convex surface.

Independent claim 13 is allowed because the prior art of record fails to disclose or suggest a semiconductor device comprising:

a first curved substrate defining a first concave surface and a first convex surface;

a first electronic component, flip-chip mounted on the first convex surface of the first curved substrate;

a second curved substrate defining a second concave surface and a second convex surface, the second curved substrate mounted on the first curved substrate through a plurality of protruding electrodes including different volumes, so as to be held above the first electronic component with the first convex surface opposing the second convex surface.

All of the allowed independent claims share the common theme of two curved substrates or packages being joined together with protruding electrodes of different volumes or having different joining areas wherein the two curved substrates or packages are joined so that their convex surfaces oppose each other. The closest prior art is Hamaguchi (USPN 6,633,078) who teaches, from figs. 3, 4, and 9 at least two substrates that have curved surfaces, yet they are all joined at convex-concave interfaces. Hamaguchi also discloses a different reason for using curved substrates: so that the substrate remains rigid (prevent deflection) when attached to a

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main board (see column 2, lines 30-55) so there is no motivation from Hamaguchi to use a convex surface opposing convex surface attachment.

Any comments considered necessary by applicant must be submitted no later than the payment of the issue fee and, to avoid processing delays, should preferably accompany the issue fee. Such submissions should be clearly labeled "Comments on Statement of Reasons for Allowance."

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Brian Kunzer whose telephone number is (571) 272-5054. The examiner can normally be reached on Monday-Friday 8:00-4:30 EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Wael Fahmy can be reached on (571) 272-1705. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

BK
3/8/2006


ANH D. MAI
PRIMARY EXAMINER